

A new species of *Calymperes* (Musci: Calymperaceae) from Peninsular Malaysia

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SYNOPSIS. *Calymperes woodii* L.T. Ellis, apparently endemic to areas of lowland rainforest in Negeri Sembilan, Peninsular Malaysia, is described and illustrated.

During March 1996 fieldwork was undertaken at Pasoh Forest Reserve, an area of lowland rainforest in eastern Negeri Sembilan, Peninsular Malaysia. Two collections from pristine forest within the reserve appear to represent a hitherto undescribed species of *Calymperes*. These specimens are identical with a collection made by G.H.S. Wood in 1954 from another area of lowland rainforest near the coast in western Negeri Sembilan – Sungei Manyala Forest Reserve. The new species is described here and named in honour of Wood who made the first collection.

Calymperes woodii L.T. Ellis, sp. nov.

C. subserrato M. Fleisch. affinis, sed foliis dimorphis, spathulatis, margine supra basin hyalinam polystrato. Type: Peninsular Malaysia, Negeri Sembilan, Sungei Manyala Forest Reserve, 10 miles SE of Port Dickson, FRI [Forest Research Institute] jungle plot 102, c. 18 m, 13 January 1954, G.H.S. Wood 1372 (BM–holotype; BM–K-isotype).

Plants reaching 0.5–1.0 cm high, in mats or as scattered shoots. Leaves curled when dry (often in one direction), erect to spreading (sometimes recurved) when moist, dimorphic (gemmiferous and nongemmiferous leaves). Nongemmiferous leaves mostly >3–4 mm long, lingulate to narrowly spatulate, with a calymperoid hyaline basal region; apices subentire to denticulate, broadly obtuse, usually apiculate. Costa ending immediately below leaf apex; in cross-section composed of dorsal and ventral bands of stereids separated by a single row of guide cells, dorsal and ventral surfaces formed by single layers of small chlorophyllose cells (Fig. 1q, r), superficial cells above hyaline leaf base subquadrate to shortly subrectangular in surface view, mostly 5–15(–22.5) × 7.5–12.5 µm (those forming the dorsal surface longer on average than those forming the ventral surface), sometimes smooth, usually with 1–2 blunt papillae, along leaf apex many protruding subacutely to acutely. Chlorophyllose lamina occupying four-fifths or more of leaf length (above hyaline basal region), unistratose; cells 6–15 × 6–12.5 µm, isodiametric to slightly longer than broad, with 4–6 sides or rounded, thick-walled (Fig. 1i, j), each ventrally drawn out as a subacute to acute protrusion, dorsally pluripapillose (Fig. 1k, l). Hyaline lamina occupying leaf base, usually not sharply defined; composed of large, subquadrate to subrectangular, thin-walled, porose, hyaline cells; an intramarginal, unistratose band of linear, thick-walled cells, c. (1–)3–6 cells wide, extending from the leaf base toward the distal end of the hyaline lamina sometimes apparent (Fig. 1p), often obscure or absent. Leaf margin plane to inflexed, from a short distance above the hyaline base to the leaf apex formed by a subentire to denticulate, polystratose rib composed of isodiametric chlorophyllose cells (stereids sometimes present internally), most superficial cells protruding as small teeth (Fig. 1m–o); in hyaline base unistratose, subentire to irregu-

larly denticulate, formed by a band of short, broad irregularly polygonal, thin-walled hyaline cells (often with oblique cross-walls), 1–2(–4) cells wide (Fig. 1p). Gemmiferous leaves often erect and slightly exserted above nongemmiferous leaves, similar to nongemmiferous leaves but up to 5 mm long and sometimes more narrowly lingulate, possessing apices modified as gemma-bearing proboscises (Fig. 1f, g). Proboscis narrowly suboblong to linear, often curved slightly backwards at tip. Costa strong (usually thicker than in nongemmiferous leaves), extending into proboscis, ending below leaf apex. Lamina narrowing abruptly into proboscis and becoming tightly recurved, becoming plane above and forming a narrow margin around the tip of the costa, ending as a rounded to shortly pointed leaf apex. Gemmae arising in a radial mass from ventral surface of the costal apex, fusiform to clavate, multicellular, uniseriate, smooth (Fig. 1g). Axillary paraphyses produced in brush-like bunches, filamentous, usually exceeding 0.5 mm long, hyaline, multicellular, normally uniseriate (Fig. 1h). Rhizoids conspicuous around base of shoots, papillose, deep purplish red. Gametangia and sporophytes not seen.

DISTRIBUTION. *Calymperes woodii* appears to be endemic to Negeri Sembilan, Peninsular Malaysia.

HABITAT. *Calymperes woodii* has been collected in rainforest at c. 18 m and 100 m above sea-level. Shoots occur in loose mats, or are scattered over rotting logs or soft bark on the trunks of trees in shaded, damp situations.

ADDITIONAL SPECIMENS EXAMINED. Peninsular Malaysia, Negeri Sembilan, Pasoh Forest Reserve, 50 Hectare Plot: tree number 151601, c. 100 m, March 1996, Ellis 9601 (BM, FRIM); tree number 131666, 100 m, March 1996, Ellis 9602 (BM, FRIM).

DISCUSSION. The absence of sporophytes in the type and other specimens of *Calymperes woodii* makes the generic placement of this species a matter of strong probability, rather than absolute certainty. Features of the gametophyte in *C. woodii* bear a degree of superficial resemblance to those found in species of both *Calymperes* and *Syrrhopodon* (the two largest genera in the Calymperaceae). However, more features of *C. woodii* are *Calymperes*-like than *Syrrhopodon*-like. For example, the structure of the proboscis in the gemmiferous leaves is virtually identical to that of several species of *Calymperes* (Fig. 1f, g), particularly *C. graeffeanum* Müll. Hal. and *C. hispidum* Renauld & Cardot (both illustrated by Ellis, 1988). Another feature, more usually associated with *Calymperes* than *Syrrhopodon*, is the possession of an intramarginal rib in the hyaline basal region of the leaf. Although often obscure to the point of absence, such a rib can be demonstrated in some leaves of *C. woodii* (Fig. 1p). The presence of axillary paraphyses (lacking in *C. graeffeanum* and *C. hispidum*) is a feature of some closely interre-

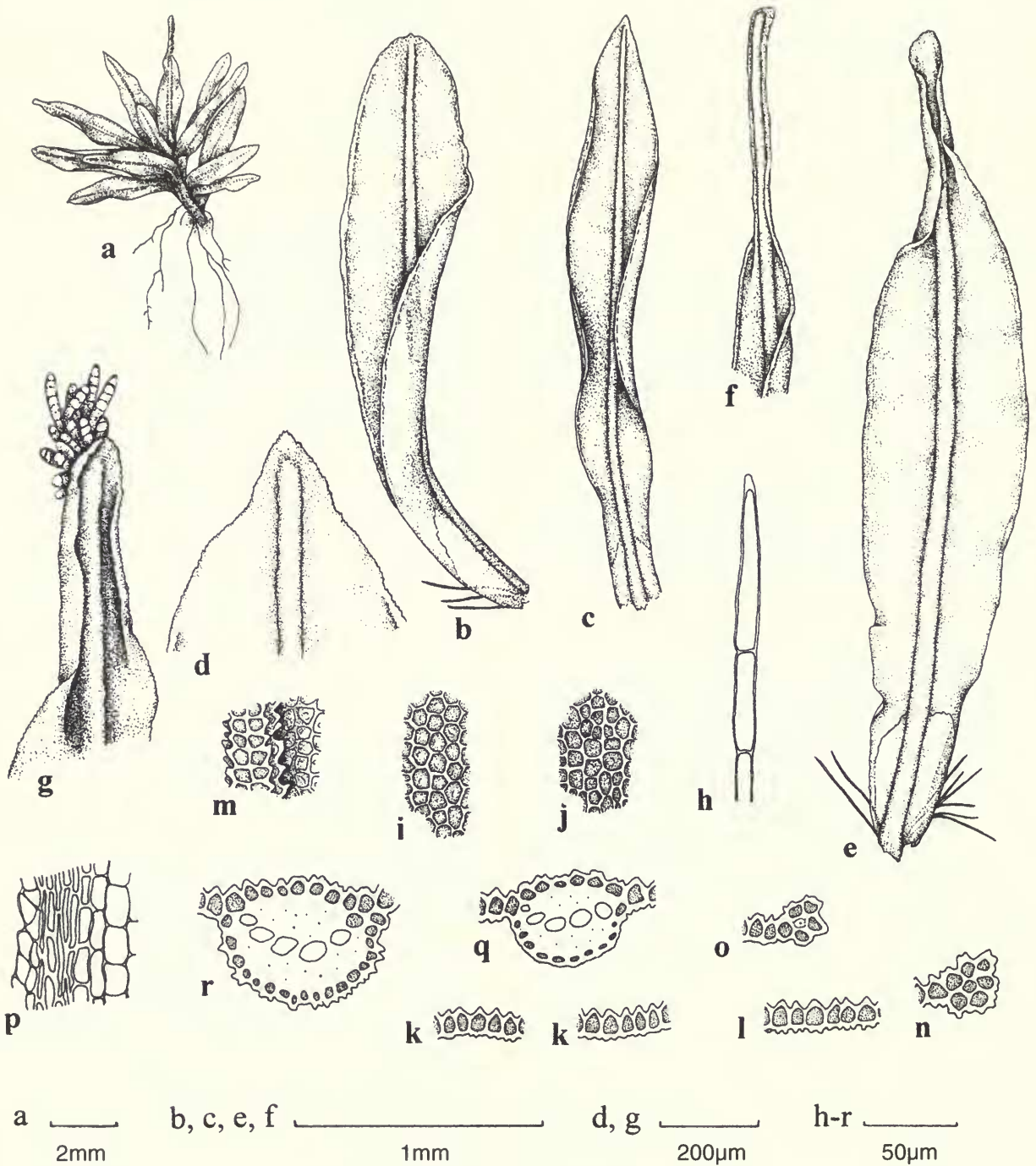


Fig. 1 *Calymperes woodii* L.T. Ellis a: habit (when moist); b–d: nongemmiferous leaf (b, c: in ventral view, d: detail of apex); e–g: gemmiferous leaf (e: in dorsal view, details of apex in f: ventral view, and g: dorsal view); h: apex of axillary paraphysis; i–l: chlorophyllose lamina (i, j: ventral surface, k, l: in cross-section); m–o: margin above hyaline leaf base (m: ventral surface, n, o: in cross-section); p: margin in hyaline leaf base; q, r: costa at mid-leaf in cross-section. a, b, d, e, g–i, l–n, r Drawn from *Ellis* 9601 (BM). c, f, j, k, o–q Drawn from *Wood* 1372 (BM).

lated species of *Calymperes*, including *C. serratum* A. Braun ex Müll. Hal., *C. subserratum* M. Fleisch., and *C. subulatum* E.B. Bartram (all regarded as conspecific by Eddy (1990) and Menzel & Schultze-Motel (1990), but shown to be distinct by Reese & Streimann (1994)). *C. woodii* has axillary paraphyses (Fig. 1b, e, h) and shows some other similarities to *C. subserratum* and its relatives, such as the possession of leaves with a poorly defined hyaline base. However, the leaves of these other paraphyses-bearing species are monomorphic (i.e. gemmiferous leaves are unmodified) and narrowly strap-shaped. In contrast, the leaves of *C. woodii* are strongly dimorphic and mostly narrowly spatulate. The type specimen of *C. woodii* (Wood 1372) was originally erroneously identified as *C. subserratum*. In addition to the features mentioned above, the latter species has entirely unistratose leaf margins which are incurved to involute and largely subentire (toward the leaf apex a few teeth may occur); the cells of the chlorophyllose lamina are $<5-10(-12.5) \times <5-7.5 \mu\text{m}$ in surface view. The margins of the leaves in *C. woodii* are polystratose (Fig. 1n, o), plane to inflexed, and minutely denticu-

late with single-celled teeth; the cells of the chlorophyllose lamina are $6-15 \times 6-12.5 \mu\text{m}$ in surface view.

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